VEHICLE SEAT SUPPORT STRUCTURE

The present invention relates to a vehicle seat support structure and, in particular, a vehicle seat support structure which enables a vehicle seat supported thereby to be moved between pre-set positions which are laterally off-set from one another relative to the vehicle.

According to an aspect of the invention there is provided a vehicle seat support structure for mounting a vehicle seat on a floor of a vehicle for selective movement between first and second positions which are laterally spaced from one another relative to the vehicle, the support structure including a plurality of links, each link being adapted to be pivotally connected at one end to the vehicle seat and at its other end to the vehicle floor.

Other advantageous features of the invention are defined in dependent Claims 2-19.

Various aspects of the present invention are hereinafter described, by way of non-limiting examples, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a vehicle seat mounted on a vehicle floor sub-frame via a vehicle seat support structure according to an embodiment of the present invention;

Figures 1a and 1b are schematic plan views of vehicle seats mounted on the sub-frame of Figure 1 showing the outer seats in their normal and comfort positions respectively;

Figure 2 is a perspective view of the seat shown in Figure 1 with its seat back folded to overlie the seat cushion;

Figure 3 is a perspective view of the folded seat of Figure 2 pivoted forwardly to an upright stowed position;

Figure 4 is a perspective view of the vehicle seat support structure according to an embodiment of the invention shown in its normal position;

Figure 5 is a perspective view similar to Figure 4 showing the vehicle seat support structure in its laterally displaced comfort positions; and

Figure 6 is a perspective view from below of the vehicle seat support structure shown in Figure 4.

A vehicle sub-frame 10 which, in use, is secured to a vehicle chassis to form part of the vehicle floor, is shown in Figures 1 to 3.

A rear vehicle seat S is mounted on the sub-frame 10. In use, as schematically illustrated in Figure 1a, three seats S_1, S_2 and S_3 are mounted on the sub-frame 10. The outer seats S_1 and S_3 are mounted on the sub-frame 10 via a vehicle seat support structure 12 according to an embodiment of the invention.

The centre seat S_2 is removably mounted on the sub-frame 10, as indicated by arrow R in Figure 1a, to thereby enable each of the outer seats S_1 and S_3 to be moved from its first, laterally outer, position (Figure 1a) to its second, laterally inner, position (Figure 1b).

The first, laterally outer, position of each of the outer seats S_1 and S_3 is referred to as the normal position of the seat and the second, laterally inner, position is referred to as the comfort position of the seat since the seat is spaced further from the vehicle side 14. It is also spaced further from its neighbouring back seat and so provides more sideways room for a passenger seated in the seat than when the seat is in its normal position.

Preferably in the comfort position, the seat is also spaced further rearwardly within the vehicle than when in its normal position, thereby giving a passenger seated in the seat more leg room.

As shown in Figures 4 to 6, the vehicle seat support structure 12 preferably includes a lower support 16 adapted for securance to the sub-frame 10, an upper support 18 upon which the seat is mounted and a plurality of links 20 which movably interconnect the lower and upper supports 16,18.

The lower support 16 is a generally I-shaped member having two cross-bar portions 22,24 and a central body member 26. Each cross-bar portion 22,24 defines a lower bearing mount 28, at each of its terminal ends, shaped to provide a generally planar bearing surface.

The upper support 18 is a generally rectangular member having two support members 30,32, each support member 30,32 including a pair of spaced, upper bearing mounts 34 shaped to define a generally planar bearing surface.

The support members 30,32 are arranged in a parallel arrangement and are interconnected by a release bar 36 at one end and a supplemental bar 38 at the other end. The support members 30,32 are preferably arranged such that the corresponding upper bearing mounts 34 are aligned with each other and are contained within the region enclosed by the support members 30,32, release bar 36 and supplemental bar 38.

While the lower and upper supports 16,18 shown in Figures 4 to 6 each include four bearing mounts 28,34, it is envisaged that in other embodiments, the lower and upper supports 16,18 may each include more or less bearing mounts 28,34.

The relative positions of the bearing mounts 28,34 on the lower and upper supports 16,18 are such that when the upper support 18 is positioned to overlie the lower support 16, corresponding lower and upper bearing mounts 28,34 are aligned with each other.

Each of the lower bearing mounts 28 is preferably movably connected to a corresponding upper bearing mount 34 by means of a link 20. In the embodiment shown in Figures 4 to 6, each link 20 includes a pivot arm 40 formed to define a generally planar connector portion 42 at each end. The links 20 are also arranged in two pairs, each pair of links 20 defining a four-bar linkage arrangement.

The connector portion 42 at each end of the pivot arm 40 is preferably mounted on the bearing surface of a respective bearing mount 28,34 so that the connector portion 42 is pivotal relative to the bearing mount 28,34.

Preferably, a thrush washer (not shown) is positioned between each connector portion 42 and the bearing surface of the respective bearing mount 28,34 to facilitate pivotal movement of the connector portion 42 relative to the bearing mount 28,34.

The opposed connector portions 42 of each pivot arm 40 are preferably connected by a dog-leg section 44 to ensure that the lower support 16 does not impede movement of the upper portion 18 relative thereto.

The relative positions of the lower and upper bearing mounts 28,34 is preferably chosen such that, in use, the upper support 18 is movable from a position where the upper support 18 overlies the lower support 16, and a

position where the upper support 18 is laterally and rearwardly offset relative to the lower support 16.

The upper support 18 may include one or more locking pins (not shown) associated with one or more of the upper bearing mounts 34. The or each locking pin is preferably biased into engagement with an aperture provided in the respective connector portion 42, thereby preventing pivotal movement of the connector portion 42 relative to the bearing mount 34.

The or each locking pin is preferably connected to the release bar 36. In such embodiments, the release bar 36 is movably connected at each end to a respective support member 30,32 of the upper support 18 such that, in use, the release bar 36 is movable upwards, away from the lower and upper supports 16,18.

Preferably, the or each locking pin is connected to the release bar 36 such that the locking pin is disengaged from the aperture provided in the respective connector portion 42 on upward movement of the release bar 36, and is re-engaged on downward movement of the release bar 36.

Preferably, the release bar 36 is biased to return to a position where the or each locking pin is engaged in the aperture provided in the respective connector portion 42 when the release bar 36 is released.

The lower support 16 preferably includes a pair of floor latches 46 secured to the underside of one of the cross-bar portions 22,24 for attaching the lower support 16 to the sub-frame 10.

On connection of the upper support 18 to the lower support 16, the floor latches 46 are preferably connected to the supplemental bar 38 of the upper

support 18. In such embodiments, the supplemental bar 38 is movably connected at each end to a respective support member 30,32 of the upper support 18 such that, in use, the supplemental bar 38 is movable upwards, away from the lower and upper supports 16,18.

Preferably, each floor latch 46 is connected to the supplemental bar 38 such that the floor latch 46 can be engaged with a corresponding striker plate 48 provided on the sub-frame 10 on upward movement of the supplemental bar 38. Similarly, each floor latch 46 can preferably be disengaged from the striker plate 48 on repeated upward movement of the supplemental bar 38.

The lower support 16 also preferably includes a pair of floor hooks 50 secured to the underside of the other of the cross-bar portions 22,24 for attaching the lower support 16 to the sub-frame 10. Preferably each floor hook 50 is engageable with a striker bar 52 provided on the sub-frame 10.

In use, the upper support 18 is secured to the underside of the seat cushion 54 of an outer vehicle seat S_1, S_3. The upper support 18 is preferably arranged such that the release bar 36 is located beneath the front portion of the seat cushion 54 and the supplemental bar 38 is located beneath the rear portion of the seat cushion 54.

The upper support 18 is movably connected to the lower support 16 by means of links 20 in the form of pivot arms 40, and the lower support 16 is secured to the sub-frame 10 by means of floor latches 46 and floor hooks 50. The upper support 18 is preferably connected t the lower support 16 such that the floor hooks 48 are located beneath the front portion of the seat cushion 54 and the floor latches 46 are located beneath the rear portion of the seat cushion 54.

On movement of the release bar 36 in an upward direction, away from the upper support 18, the or each locking pin is disengaged from the aperture provided in the respective connector portion 42. This then allows movement of the upper support 18 relative to the lower support 16 to a position where the upper support 18 is laterally and, preferably, rearwardly offset relative to the lower support 16, thereby moving the seat to its comfort position. On release of the release bar 36, the or each locking pin is re-engaged within the aperture provided in the respective connector portion 42, thereby locking the upper support 18 in the laterally and rearwardly offset position relative to the lower support 16.

The upper support 18 may be returned to a position where it overlies the lower support 16, thereby returning the seat to its normal position, on repeated upward movement of the release bar 36 to disengage the or each locking pin in a similar manner.

The seat S preferably includes a seat back 56 movably connected to the seat cushion 54 such that it movable between an upright position relative to the seat cushion 54, as shown in Figure 1, and a folded position where the seat back 56 is folded to overlie the seat cushion 54, as shown in Figure 2.

When the seat back 56 is located in its folded position, the floor latches 46 may be disengaged from the striker plates 48 of the sub-frame 10 on upward movement of the supplemental bar 38 located beneath the rear portion of the seat cushion 54.

The support structure 12 may then be tipped forwards about the pivotal connection between the floor hooks 50 and the striker bar 52 provided on the sub-frame 10, thereby pivotally moving the seat cushion 54 forwardly to an upright stowed position, as shown in Figure 3.

The vehicle seat preferably includes a stay (not shown) to maintain the seat cushion 54 in its upright stowed position. In this position, the floor hooks 50 may be disengaged from the striker bar 52, permitting removal of the seat from the vehicle.

While the arrangements described with reference to Figures 1 to 6 require the provision of lower and upper supports 16,18 it is envisaged that, in other embodiments, each of the links 20 may be adapted to be connected at one end directly to the vehicle seat cushion 54 and at its other end directly to the vehicle floor.